Student Achievement

Eight years into the NCLB era, the United States is still very much at risk educationally. There must be no confusion about this point. Evidence comes from multiple sources, beginning with our own National Assessment of Education Progress, most recently administered in 2007. In the foundation subjects of reading and math, our levels of achievement are unacceptably low.[4] Looking across the three tested grade levels—fourth, eighth, and twelfth—only *one-third*

4. NAEP is not a perfect measure of achievement—nothing is. Some mathematicians argue that NAEP assessments in grade eight contain too much lower level mathematics, particularly whole number sense, and not enough fractions, decimals, and pre-algebra. NAEP math also places a premium on the ability to solve word problems, a product of the frameworks from the National Council of Teachers of Mathematics on which NAEP is based. Because NAEP has arguably insufficient higher level math content, students must score very well to be declared proficient. The test may therefore understate math proficiency. However, an international exam that mathematicians regard as more rigorous, TIMSS, shows middling levels of math achievement as well, particularly if the test's limited country sample is kept in mind. An international comparison of math achievement including all OECD countries and samples of 15-year-olds, PISA, finds US students in the bottom quartile in math achievement. On the weaknesses of NAEP math assessments, see Tom Loveless, "Is Proficiency on NAEP Set Too High?" *Brown Center Report on American Education* (Washington, D.C.: Brookings Institution, 2007), pp. 10–13. NAEP's assessment of reading skills is more widely accepted as accurate. NAEP, we should also recognize, is the product of the work of highly regarded psychometricians and

of all students on average are "proficient" or "advanced" in reading. In math, the average proficient or advanced rate is also about one-third, though it declines markedly with age, from about 40 percent at grade four to less than 25 percent in grade twelve. What this means, in practical terms, is that only a third of American young people are demonstrating full mastery of the knowledge and skills that education experts believe appropriate for their respective grade levels. For perspective, in the highest achieving nations in the world, two-thirds of all students demonstrate proficiency by NAEP standards.[5]

For American students falling short of proficiency, the picture is even grimmer. Like most tests that measure students against objective standards (rather than against other students), NAEP establishes categories of performance to reflect distinct levels of mastery. If students do not reach full mastery—or proficiency—they can be considered "basic" if they show understanding of certain essentials of a subject or "below basic" if they fall short of grasping even the essentials. Falling below basic generally means performing several grade levels below age expectations. Based on the latest NAEP, roughly *one-third* of all students are achieving below basic. At this level, students leave high

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education content specialists, overseen by a bipartisan panel of national experts, the National Assessment Governing Board. The NAEP scores reported in this section are from the main NAEP, 2006 for reading and 2007 for math. See also, Organization for Economic Cooperation and Development, Programme for International Assessment, *PISA 2006: Science Competencies for Tomorrow's World*; Organization for Economic Cooperation and Development, Programme for International Assessment, *Learning for Tomorrow's World: First Results from PISA 2003*; U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, *Trends in International Math and Science Study* (2007).

5. For estimates of how other nations might perform on NAEP, see Gary W. Phillips, "Linking NAEP Achievement Levels to TIMSS" (Washington, D.C.: American Institutes for Research, April 2007).

school utterly unprepared for college or demanding work—if they graduate from high school at all. For the nation's black and Hispanic students, these numbers are worse still. *Two-thirds* on average score below basic in reading and in math.[6] It is no surprise that urban dropout rates now frequently exceed 50 percent.[7]

No Child Left Behind focuses on reading and math—so the law has certainly not cured what ails us. Yet, in fields that NCLB has hardly touched, science and history, matters are even more troubling. Science achievement is critical to many of the economic opportunities of the future. History is vital to citizenship at home and in the larger world that is ever more relevant to our young people. By NAEP standards, achievement in these areas is abysmal. About 15 percent of American students, again averaging across fourth, eighth, and twelfth grades, are proficient or advanced in history. In science the average is less than 25 percent.[8]

The national data are reinforced by international data. Questions are sometimes raised whether NAEP performance levels are set too high, providing an unnecessarily discouraging view of US achievement.[9] Fewer students score as proficient on NAEP than

6. Concomitantly, few black and Hispanic students score proficient or advanced. Less than 15 percent of black students, averaged across fourth, eighth, and twelfth grade, reach these levels in reading. Only 10 percent meet these standards in math. The patterns are the same for Hispanic students, but with average scores about 3 percentage points higher. These data and other averages cited in the text have been collected from the NAEP Data Explorer data tool on the NAEP web site. Go to http://nces.ed.gov/nationsreportcard/naepdata/.

7. Jay P. Greene and Marcus A. Winters, "Leaving Boys Behind: Public High School Graduation Rates," Civic Report No. 48 (New York: Manhattan Institute, April 2006).

8. Go to http://nces.ed.gov/nationsreportcard/naepdata/.

9. When NAEP is equated to international tests such as TIMSS, high achieving nations such as Singapore, outperform the United States by more than 2 to 1.

on any state achievement test. But when US students are compared to students internationally, the picture of underachievement remains the same. The most comprehensive international measure is the Program for International Assessment (PISA), which compares thirty Organization for Economic Cooperation and Development (OECD) nations.[10] The last two assessments, in 2003 and 2006, found US 15-year-olds, the age group tested, below the middle of the pack in math and science. The 2006 study showed US students in twenty-first place out of thirty nations in science and twenty-fifth out of thirty in math. What NAEP indicates about math and science achievement—that US students generally score low—is reinforced by comparisons with many other nations.

Weak achievement in school translates into weak achievement after graduation. Although the United States has a university system that is the envy of the world—and enrolls large numbers of international students—Americans do not take full advantage. Only 30 percent of American young people earn bachelor's degrees, a middling percentage relative to other nations. In 1995, the United States led the world in college degrees; today we are not in the top

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In eighth grade math, 73 percent of all Singapore students would score proficient or better on NAEP. The proficiency standard set by NAEP is clearly achievable by the vast majority of students in a high-achieving nation. This begs the question as to whether NAEP is too high a standard to benchmark NCLB, which has a 100 percent proficiency goal. But even if NAEP is too high of a standard to insist every student in the nation meet it, it is clearly not a standard that is too high for understanding whether American students are satisfying reasonably high expectations. For a critical discussion of this point, see Loveless, "Is Proficiency on NAEP Set Too High?"

10. Organization for Economic Cooperation and Development, Programme for International Assessment, *PISA 2006: Science Competencies for Tomorrow's World*; Organization for Economic Cooperation and Development, Programme for International Assessment, *Learning for Tomorrow's World: First Results from PISA 2003*.

ten.[11] Few Americans secure advanced degrees in technical fields—what the twenty-first century demands. For example, in 2005, among master's and doctoral degrees earned by US students, 13.7 percent were in science and 6.4 percent in engineering. Among Japanese students, 38.5 percent were in science and the same percentage in engineering.[12]

These test scores matter, not only for the welfare of individual students but for the welfare of the nation as whole. Extensive research shows that individuals who obtain higher test scores on standardized achievement tests do better in the labor market. Similarly, the distribution of skills measured by achievement tests affects the distribution of income in society: chronic underperformance by low-income and minority students generates income disparities later in life. Finally, standardized test scores predict the acquisition of skills that affect the growth of national income and thus the future well-being of society.[13]

This is an alarming and frustratingly familiar story. Policymakers have been hearing it since *A Nation at Risk*. The US has been behind other nations at least that long. NAEP scores have shown low levels of proficiency and gaping racial differences in achievement

11. On higher education performance and other pertinent international comparisons, see National Governors Association, Council of Chief State School Officers, and Achieve, Inc., *Benchmarking for Success: Ensuring U.S. Students Receive a World-Class Education* (Washington, D.C.: December 2008).

12. U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, *Digest of Education Statistics* (2005).

13. See Eric A. Hanushek and Ludger Woessmann, "The Role of Cognitive Skills in Economic Development," *Journal of Economic Literature* (Summer 2008, vol. 43, no. 3), pp. 607–668; Eric A. Hanushek, "Some Simple Analytics of School Quality," *NBER Working Paper* (no. 10229, January 2004); Eric Hanushek, Dean T. Jamison, Eliot A. Jamison, and Ludger Woessmann, "Education and Economic Growth," *Education Next* (Summer 2008, vol. 8, no. 2), pp. 62–70.

since then as well. But amidst these persistent causes for concern are genuine reasons for hope. Levels of achievement are low to be sure, but the nation's students have been making progress, and the progress is increasingly well understood.

Let us reexamine NAEP. In the 1990s, before NCLB and before most states implemented accountability systems, US fourth graders scored 12 percent proficient or above in math—just 12 percent. Since 2000, the average has risen to 39 percent, a threefold increase. Among white fourth graders, proficient or advanced scores jumped from 15 to 51 percent, among blacks from 1 to 15 percent, and among Hispanics from 4 to 22 percent. At grade eight, the gains in math were not quite as large, but dramatic nonetheless: 15 to 31 percent overall, 18 to 41 percent among whites, 5 to 11 percent among blacks, and 7 to 15 percent among Hispanics. By any standard these are very large gains.[14]

In reading, progress has also occurred. It has been slower, as reading gains typically are. Reading is a skill heavily influenced by the home and community environment and harder for schools to drive than is math. Yet, in grades four and eight, overall scores of proficient or advanced rose 5 percent from the 1990s to the 2000s. Among white students the gains averaged 7 points, among black students 5 points, and among Hispanic students 4 points.

These gains are consistent with the implementation of NCLB and the state accountability systems that set the precedent for

14. The gains on NAEP math are greater than on international measures of math achievement. The NAEP measures are based on the standards of the National Council of Teachers of Mathematics (NCTM) and emphasized problem-solving skills over more traditional skills of number sense. The NAEP math standards are also arguably lower than international standards. Nonetheless, US students made great strides on the NAEP math assessment, likely reflecting genuine learning of the NCTM-based curriculum being taught in the country from the late 1980s forward. On the issues with NAEP math standards and assessments, see Loveless, "Is Proficiency on NAEP Set Too High?"

NCLB. It is far too early to estimate with confidence the impact that NCLB has had on rising math and reading scores. But more disaggregated views of NAEP data point to NCLB as a possible cause. A recent study by the Thomas B. Fordham Institute examined the achievement of two important subgroups—the lowest achieving 10 percent of the population, or the students most at risk of being "left behind," and the top 10 percent of the distribution, or the students some fear NCLB may cause to be neglected. That analysis found very impressive gains by the lowest 10 percent in math from 2000 to 2007: 18 scale points at grade four and 13 scale points at grade eight. Roughly 11 scale points represent one grade equivalent. In the brief NCLB era, then, the nation's lowest students gained materially in math. Happily, math gains were also made by the top students, though not as great as the lowest students: 10 and 5 scale points in grades four and eight respectively.[15]

In reading, the news was very good at grade four for the lowest 10 percent: skills rose 16 points on the NAEP scale. Again, this gain was from just 2000 to 2007. Top students improved, but only by 3 points over this time span. In grade eight reading, the pattern was not so encouraging: the lowest students gained zero while the top students lost 3 points. Nevertheless, in math large gains were made by both subgroups at both grades. In grade four reading the weakest students progressed more than a grade equivalent while top students inched forward. In both subjects and grade levels, the gap in achievement between top and bottom narrowed.

15. Ann Duffett, Steve Farkas, and Tom Loveless, *High Achieving Students in the Era of No Child Left Behind* (Washington, D.C.: Thomas B. Fordham Institute, June 2008). Note that the scale scores used to describe NAEP achievement in this study are different from the proficiency levels used earlier in our analysis. The scale scores underlie the proficiency levels and allow finer measurement of student progress than do the proficiency levels, each of which subsumes a range of scale points.

The Fordham study also examined whether the gains that occurred after 2000 were unique to this NCLB era or were continuations of trends that began in the 1990s. The lowest NAEP achievement decile gained at a significantly higher rate during the NCLB era than during the 1990s. The highest achievement decile gained at about the same rate in both eras. Overall, it appears that reforms during the 1990s, largely at the state levels, promoted achievement gains in reading and especially in math. During the 2000s, these gains continued but accelerated for the lowest achieving students.[16]

Progress in reading and math, however, has not been replicated in science and history. Scores from the 1990s and 2000s are virtually identical—and low. This is obviously not part of the good-news story, but it is relevant to the tale of progress. The NCLB era that began as the legislation took shape in 2001, and the accountability era that began in the states in the 1990s, have been associated with substantial achievement gains in math and lesser gains in reading—without question. The focus of these times has been sharply on

16. To be clear, the Fordham study could not associate the gains after 2000 with NCLB directly. Implementation of NCLB did not begin until 2002, and some of the post-2000 gains occurred in 2001. Temporally, most of the post-2000 gains did occur after NCLB took effect, *suggesting* cause and effect. A federal analysis of Title I found much the same patterns as the Fordham study. The Institute of Education Sciences conducted a comprehensive assessment of Title I, as required by NCLB. Its October 2007 final report found that students in high-poverty schools were making larger gains on NAEP in reading and math than students in low-poverty schools, since both 2000 and 2003, when NCLB took effect. U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, *National Assessment of Title I: Final Report*, vol. 1, *Implementation* (Washington, DC, October 2007), pp. 38–43. Still, more research will be needed to determine how much NCLB and other factors contributed to the post-2000 gains in reading and math.

improving math and reading skills. Science and social studies have been of secondary concern in the states, if considered at all. The lack of progress in these subjects is consistent with the hypothesis that NCLB and state accountability requirements are having an impact. As we shall see subsequently, there is additional evidence that accountability is working.[17]

Policymakers must continue to approach the nation's education problems with urgency. Achievement remains low and its gaps remain wide. But policymakers should also pay close attention to the progress that has been made. Gains in test scores and reductions in achievement gaps are likely no accident. They parallel bold policies that began to be put in place by the states and culminated with the federal government's enactment of NCLB. There are lessons now to be learned. We should acknowledge our progress and build thoughtfully upon it.

17. Go to http://nces.ed.gov/nationsreportcard/naepdata/.